



US009510774B2

(12) **United States Patent**
Russell

(10) **Patent No.:** **US 9,510,774 B2**
(45) **Date of Patent:** **Dec. 6, 2016**

(54) **GAS MEASUREMENT MODULE FOR USE
IN THERAPEUTIC SETTINGS COMPRISING
REFLECTIVE SCANNING
MICROSPECTROMETER**

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 861 days.

(21) Appl. No.: **13/514,476**

(22) PCT Filed: **Dec. 1, 2010**

(86) PCT No.: **PCT/IB2010/055535**

§ 371 (c)(1),
(2), (4) Date: **Jun. 7, 2012**

(87) PCT Pub. No.: **WO2011/070485**

PCT Pub. Date: **Jun. 16, 2011**

(65) **Prior Publication Data**

US 2012/0242980 A1 Sep. 27, 2012

Related U.S. Application Data

(60) Provisional application No. 61/267,929, filed on Dec.
9, 2009.

(51) **Int. Cl.**

G01J 5/10 (2006.01)
A61B 5/08 (2006.01)
G01N 21/3504 (2014.01)
G01N 33/497 (2006.01)
G01J 5/20 (2006.01)
G01N 21/3563 (2014.01)

(Continued)

(52) **U.S. Cl.**

CPC **A61B 5/08** (2013.01); **A61B 5/082**
(2013.01); **G01N 21/3504** (2013.01); **G01N**
33/497 (2013.01); **G01J 5/02** (2013.01); **G01J**
5/10 (2013.01); **G01J 5/20** (2013.01); **G01N**
21/3563 (2013.01); **G01N 21/3581** (2013.01)

(58) **Field of Classification Search**

USPC 250/338.1, 353
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,792,272 A * 2/1974 Harte et al. 250/343
3,848,974 A * 11/1974 Hosking et al. 345/7
3,924,925 A * 12/1975 Gale et al. 359/24

(Continued)

OTHER PUBLICATIONS

Collimated Light [online], [retrieved on May 17, 2015]. Retrieved
from the Internet:<URL:http://en.wikipedia.org/wiki/Collimated_
light>.*

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(57) **ABSTRACT**

Gas within a ventilation circuit is analyzed by a spectrom-
eter included in an airway adaptor that is inserted into the
ventilation circuit. The spectrometer is formed from reflect-
ive members that process electromagnetic radiation while
folding the path of the electromagnetic radiation in such a
manner that the form factor of the airway adaptor is
enhanced. Further, because of the scale of the spectrometer
within the airway adaptor, the cost savings associated with
manufacture of the reflective elements instead of refractive
elements may significantly reduce the cost of the airway
adaptor.

15 Claims, 4 Drawing Sheets

